Planetary Protection Issues

Pluto-Kuiper Belt Pre-Proposal Briefing

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2/1/01

International Agreement on Planetary Protection

Article IX of the Outer Space Treaty of 1967:

- “...parties to the Treaty shall pursue studies of outer space including the Moon and other celestial bodies, and conduct exploration of them so as to avoid their harmful contamination and also adverse changes in the environment of the Earth resulting from the introduction of extraterrestrial matter and, where necessary, shall adopt appropriate measures for this purpose...”

"Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies."

(entered into force, October 10, 1967).

Planetary Protection Policy

It is NASA's policy to:

- Preserve planetary conditions for future biological and organic constituent exploration

- To protect Earth and its biosphere from potential extraterrestrial sources of contamination

Planetary Protection Mission Constraints

- Depend on the nature of the mission and on the target planet
- Depend on current knowledge, based on internal and external recommendations, "but most notably from the Space Studies Board of the National Academy of Sciences”
- Specific measures include:
  - » Reduction of spacecraft biological contamination
  - » Constraints on spacecraft operating procedures
  - » Spacecraft organic inventory and restrictions
  - » Restrictions on the handling of returned samples
  - » Documentation of spacecraft trajectories and spacecraft material archiving

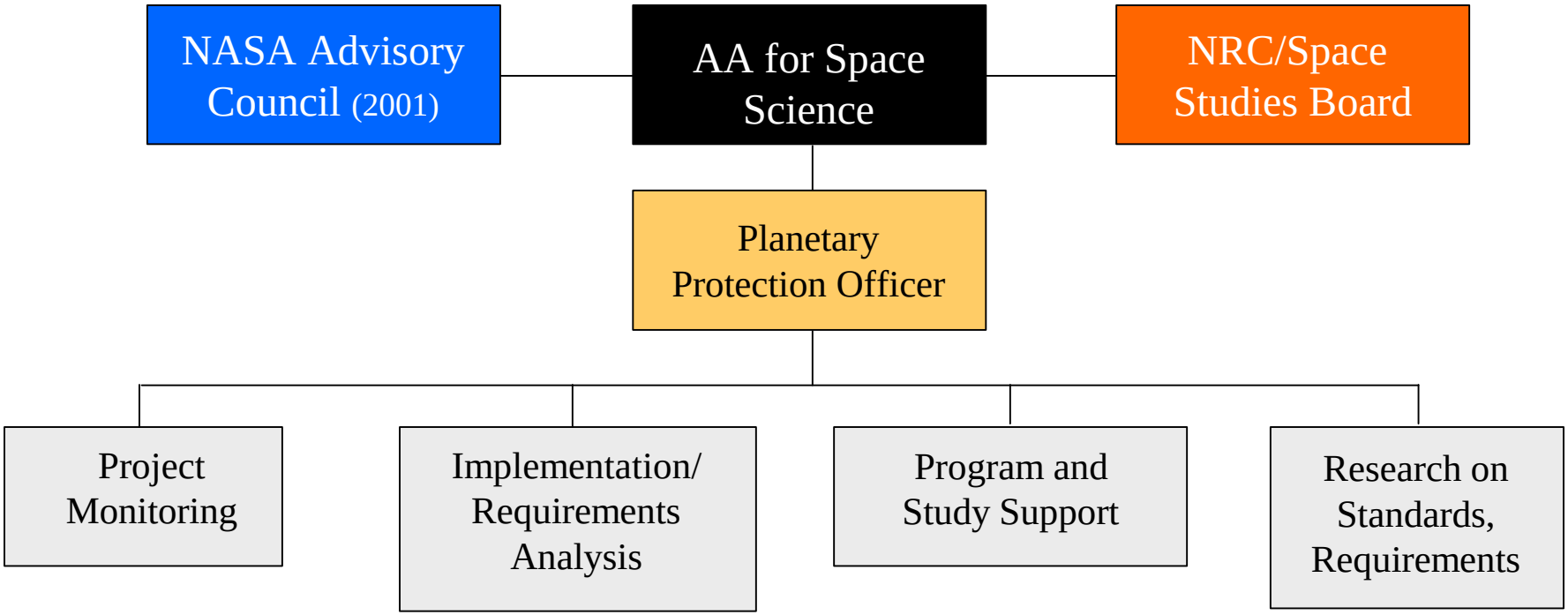
Planetary Protection Mission Categories (NPG 8020.12B)

PLANET PRIORITIES		MISSION TYPE	MISSION CATEGORY	BODIES
A	Not of direct interest for understanding the process of chemical evolution. No protection of such planets is warranted (no requirements)	Any	I	Mercury Sun Pluto?
B	Of significant interest relative to the process of chemical evolution, but only a remote chance that contamination by spacecraft could jeopardize future exploration.	Any	II	Jupiter, Pluto? Saturn
C	Of significant interest relative to the process of chemical evolution and/or the origin of life or for which scientific opinion provides a significant chance of contamination which could jeopardize a future biological experiment.	Flyby, Orbiter Lander, Probe	III IV	Mars Europa Etc.?
All	Any Solar System Body	Earth-Return	V	All

NASA Planetary Protection Documents

- NPD 8020.7 establishes NASA policy for planetary protection, which includes protection of planetary bodies for future exploration and of Earth from extraterrestrial sources of contamination. (Version “E” February 1999)
- NPG 8020.12 is issued to delineate a uniform set of planetary protection requirements for all NASA robotic extraterrestrial missions. Implementation of these requirements will ensure that biological safeguards are being followed in NASA's space programs. (Version “B” April 1999)
- NPG 5340.1 provides the basic procedures for performing microbial assays for assessing contamination levels of spacecraft. (Version “D” is in work)

Planetary Protection Office Overview



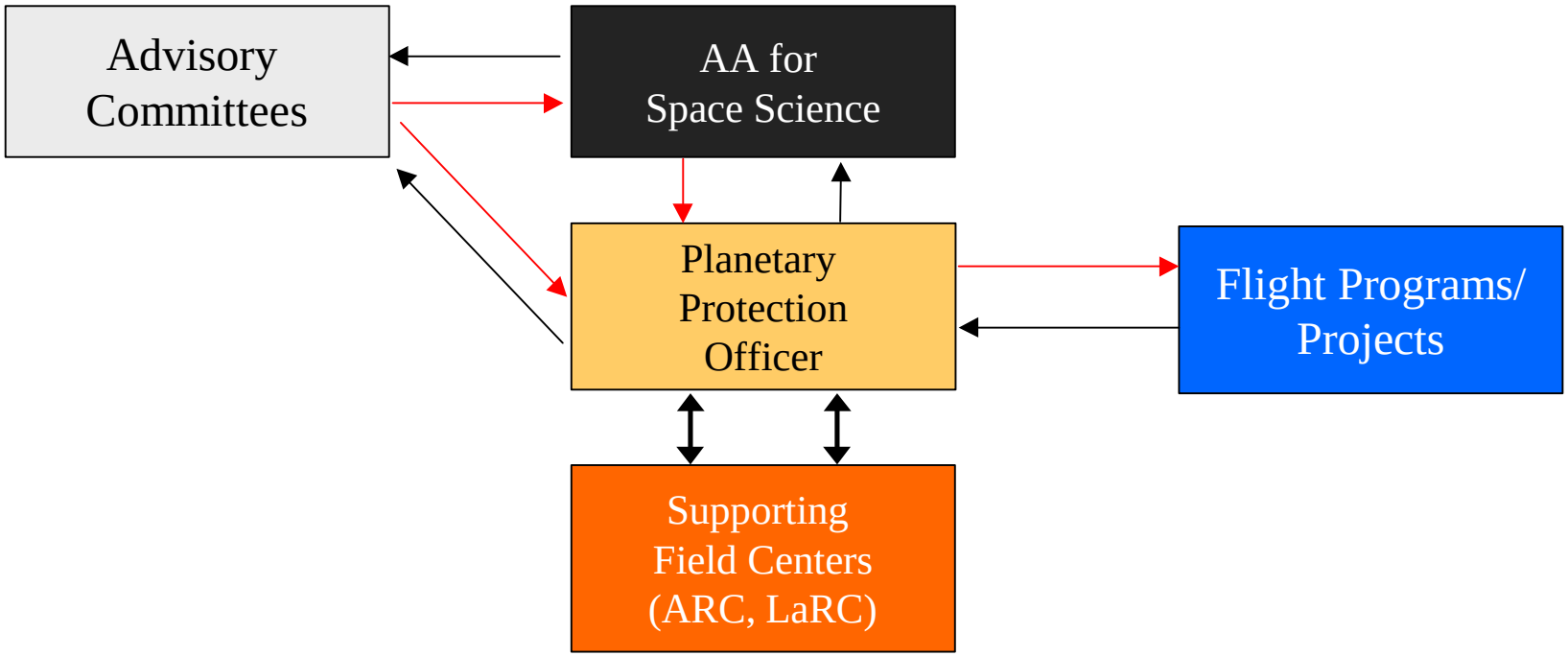
Project Monitoring
- Plans, reports, status
- Implementation Assurance

Implementation/Requirements Analysis
- Project plan analysis and independent review
- Implementation strategies and outcomes

Program and Study Support
- Workshops and Working Groups
- Committee Staff and Liaison
- Advanced Planning

Research on Standards, Requirements
- Project-common methods/quals
- Implications of exobiological findings

Planetary Protection Policy / Work Flow



Requirements/Advice

Requests/Information

Tasks/Funding